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FOODBORNE PATHOGENS

WASTEWATER-BASED EPIDEMIOLOGICAL SURVEILLANCE

Weekly report
2024 Week 28

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National wastewater-based epidemiological surveillance

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2. SUMMARY

In the present work, the circulation of the SARS-CoV-2 virus in the environment is assessed based on three alerting indicators. The analysis of wastewater samples collected in 30 wastewater treatment plants covers 38% of the Belgian population. The results of the wastewater surveillance are a complementary source of information to the infection cases number. Indeed, the wastewater results do notably include all asymptomatic persons, and are independent of the testing strategy.

Here are the conclusions based on the latest results of week 28 (July 08th 2024)[1]:

- At the national level: After several weeks of increase, the viral load is now decreasing and remains at a moderate level compared to the 9th wave.
- At the regional level: The High Circulation indicator is in alert in Flanders and Wallonia. The Increasing Trend indicator is in alert in Wallonia.
- At the covered areas level: among the 29 areas covered, the number of treatment plants in alert for the different indicators are 7 for the Increasing Trend indicator, 5 for the Fast Increase indicator, and 10 for the High Circulation indicator.

The emergence of SARS-CoV-2 variants may impact the epidemiological situation. Depending on the genetic changes, virus characteristics such as transmissibility, virulence, immune evasion, or detectability can be impacted. The following conclusions are based on the genomic results obtained between 2023-01-09 (2023-W02) and 2024-06-03 (2024-W23):

- In the area of Brussels-North, during the wave starting in May 2024, the BA.2.86 variant was dominant, with a majority of JN.1 Pango lineage (also named FLiRT).
- Difference between areas: the limited data available shows that the genomic situation is similar in four areas analysed.

The wastewater situation can be followed on a weekly basis on:

- The graphics available on the public COVID-19 dashboard
- The epidemiological update published on Fridays by the Risk Assessment Group (RAG) after validation by the Risk Management Group (RMG) in French and Dutch.
- Further details on the methodology applied for the wastewater surveillance can be found in the Appendix Methodology document (access available online).

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[1] The wastewater surveillance is based on 30 areas. However, due to technical issues, the area of Marche-en-Famenne was not sampled this week (see Appendix A5). Hence, this week's report is only based on 29 areas.

3. INTRODUCTION

The national wastewater-based surveillance of COVID-19 started in September 2020. The present report aims to assess the wastewater-based epidemiological situation in Belgium. It is updated weekly on Tuesday based on the concentration measured in the samples during the previous week.

The SARS-CoV-2 concentrations are measured once a week in 30 wastewater treatment plants (WWTPs). The evolution of these concentrations is assessed in the present report thanks to three wastewater-based alerting indicators. The assessment is performed at 4 different spatial levels: national, regional, provincial, and the areas covered by the treatment plants.

Also, the wastewater-based genomic situation in Belgium is assessed. Sequencing of wastewater provides information on the genomic viral diversity circulating in the general population, without bias related to patients health-seeking behaviour. It is performed to complement genomic surveillance obtained through sentinel networks.

Sequencing for SARS-CoV-2 is performed at surges and at peaks of COVID-19 infection outbreaks. The areas selected to conduct sequencing are located in the three Belgian regions: Gent, Liège Oupeye and Brussels-North. Additionally, the samples covering the area of Brussels Airport are analyzed. Brussels Airport is likely an important entry point for variants on the Belgian territory.

Genomic surveillance of environmental samples will not be limited to SARS-CoV-2, but will be extended to other respiratory viruses such as Influenza and RSV in the coming months.

Finally, the remaining sources of uncertainties are discussed together with their expected impacts on the interpretation of the wastewater results.

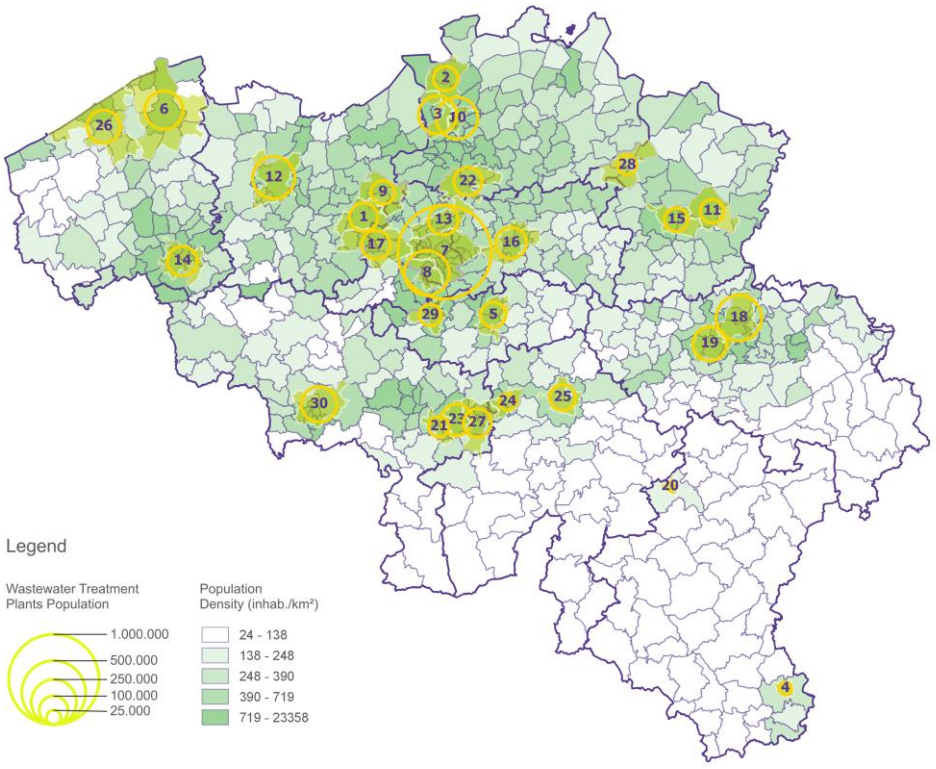
4. METHODOLOGY

4.1. Sample collection and analysis

Samples are collected once a week in several wastewater treatment plants (WWTP) covering around 38% of the Belgian population: 30% in the Flemish region, 30% in the Walloon region, and nearly 100% in the Brussels region. Figure 1 shows the catchment areas covered by the WWTP located in areas with high population density. The catchment area of a WWTP corresponds to the geographical area from which the wastewater are collected.

Samples are collected on Mondays by auto-samplers (24-hour composite) at the influent of WWTP. The analysis are distributed amongst 2 different laboratories to quantify the concentration of SARS-CoV-2 RNA. The results corresponding to the samples of the Mondays are made publicly available on the Thursday of the same week.

Further details on the coverage, sampling plan, and analytical method can be found in the Appendix Methodology document



Treatment plant	id	Population
Aalst	1	98 357
Antwerpen-Noord	2	73 974
Antwerpen-Zuid	3	178 677
Arlon	4	19 440
Basse Wavre (Dyle)	5	78 290
Brugge	6	180 586
Bruxelles-Nord	7	1 080 145
Bruxelles-Sud	8	249 307
Dendermonde	9	69 500
Deurne	10	215 592
Genk	11	68 582
Gent	12	220 130
Grimbergen	13	107 643
Harelbeke	14	107 894
Hasselt	15	69 586
Leuven	16	120 939
Liedekerke	17	101 075
Liège Oupeye	18	253 780
Liège Sclessin	19	142 240
Marche-en-Famenne	20	8 633
Marchienne-au-Pont	21	52 017
Mechelen-Noord	22	98 143
Montignies-sur-Sambre	23	123 576
Mornimont	24	34 139
Namur-Brumagne	25	82 175
Oostende	26	135 491
Roselies	27	96 890
Tessenderlo	28	45 125
Vallée du Hain (l'Orchis)	29	57 826
Wasmuel	30	157 343

Figure 1 ● The population located in the areas covered by the wastewater treatment plants (highlighted in yellow) and the population density for each municipality (indicated by the green scale). From the first January 2024 onwards, only 30 areas are covered by the surveillance.

4.2. Wastewater results

In order to account for possible dilution by rainy events and for the number of people living in the catchment area of each WWTP, a correction is applied on the viral concentration: the concentration is multiplied by the inlet flow and divided by the number of inhabitant of its respective WWTP and expressed by 100k inhabitant. The viral loads are expressed in copy/day/100k inhabitants.

The limit of quantification of the analytical method was estimated at 10 copies/ml.

4.3. Alerting indicators

To highlight the areas of possible concern, the three alerting indicators are assessed once a week, based on viral loads (RNA copies/day/100k inhabitants):

1. The **Increasing Trend** indicator highlights the catchment areas where the viral loads have been increasing for more than 6 days. The indicator is computed based on the moving average on the past two weeks of the viral load.
2. The **Fast Increase** indicator highlights the catchment areas where the viral loads have rapidly increased for the last week. It corresponds to a situation where the moving average on the past 7 days of the viral load has increased faster than 70% per week if being above the estimated limit of quantification. The increasing slope is normalized for each treatment plant.
3. The **High Circulation** indicator highlights the catchment areas where the viral loads are high. It corresponds to a situation where the viral loads exceed half of the highest value recorded during the ninth wave (i.e. from 21th of November 2022 till first of January 2023).

The indicators were developed to monitor the different phases of an outbreak. the indicator Increasing Trend will be on alert first in the emerging phase. If the viral loads increase quickly, the Fast Increase indicator will then turn on alert. Finally, the viral loads may be sufficiently high to result in the High Circulation indicator to turn on alert.

4.4. Genomic analysis

Samples collected through the SARS-CoV-2 wastewater-based surveillance are used for sequencing analysis. Next-Generation sequencing is performed by the BIOTechlab at the service of Transversal Activities in applied Genomics at Sciensano. The Freyja tool is used to obtain the SARS-CoV-2 lineages with a minimal frequency of 2.5% and depth coverage of 500. Mutations with depth coverage below 500 are excluded from the reporting.

Variants are reported using the ECDC classification system: i) the variant meeting the VOC criteria are not currently existing, ii) The variants meeting the VOI criteria are: XBB.1.5-like, XBB.1.5-like+F456L, and BA.2.86.

In this report, VOC and VOI variant according to the ECDC classification system are presented in graphs. Other variants of the ECDC system are grouped in a category named “Other”. And, variant not belonging to the ECDC classification system are gathered in a “Unassigned by ECDC” category. Further details on the classification are available online.

Further details on the analytical method are available online.

4.5. Caution points for the interpretation of results

The viral loads should not be directly compared between catchment areas, provinces, nor regions because analyses are conducted by three different laboratories. To mitigate this bias, the indicators are computed on normalized viral loads, allowing for comparison between the different areas. Further details are available in the methodology document (access online).

5. RESULTS

5.1. National level

Table 1 shows, at the national level, the results obtained on week 28 (last sample of July 08th 2024), compared to the ones obtained on week 27 (July 01th 2024). In this table, any change in indicator status (i.e. if the value for any indicator has changed from 0 to 1 or from 1 to 0) is indicated in **coloured bold text**.

None of the three indicators is in alert at the national level

Table 1 ● Indicators in alert (1) or not (0) on week 28 (July 08th 2024). Columns represent the population coverage of Belgium (Pop. coverage) and the three alerting indicators High Circulation (High), Fast Increase (Fast) and Increasing Trend (Incr.). The specifications of the four last columns are explained in the footnotes 1-4 below the table. Missing data is indicated with a "/".

Country	Pop. coverage	High	Fast	Incr.	Norm. viral load (%)[1]	Mean viral load[2]	Norm. evol. (%/week)[3]	Incr. days[4]
Belgium	38%	0	0	**0**	50	0.38	16	4

[1] : the viral load normalized with the maximum viral load measured in the corresponding catchment area during the ninth wave (i.e. from 21th of November 2022 till the first of January 2023).
[2] : the viral load computed on the mean of the replicate of the three targeted gene fragments as explained in section "3.2 Wastewater results". The mean viral load is expressed in 10^12 copies/day/100k inhabitants.
[3] : the slope (%/week) of the past 7 days moving average of the viral load if the corresponding concentration is above the estimated limit of quantification.
[4] : the cumulative number of days of increase of the past 14 days moving average of the viral load.

The geographical location of the areas is presented in Figure 2 together with the status of the three indicators.

After several weeks of increase, the viral load is now decreasing and remains at a moderate level compared to the 9th wave.

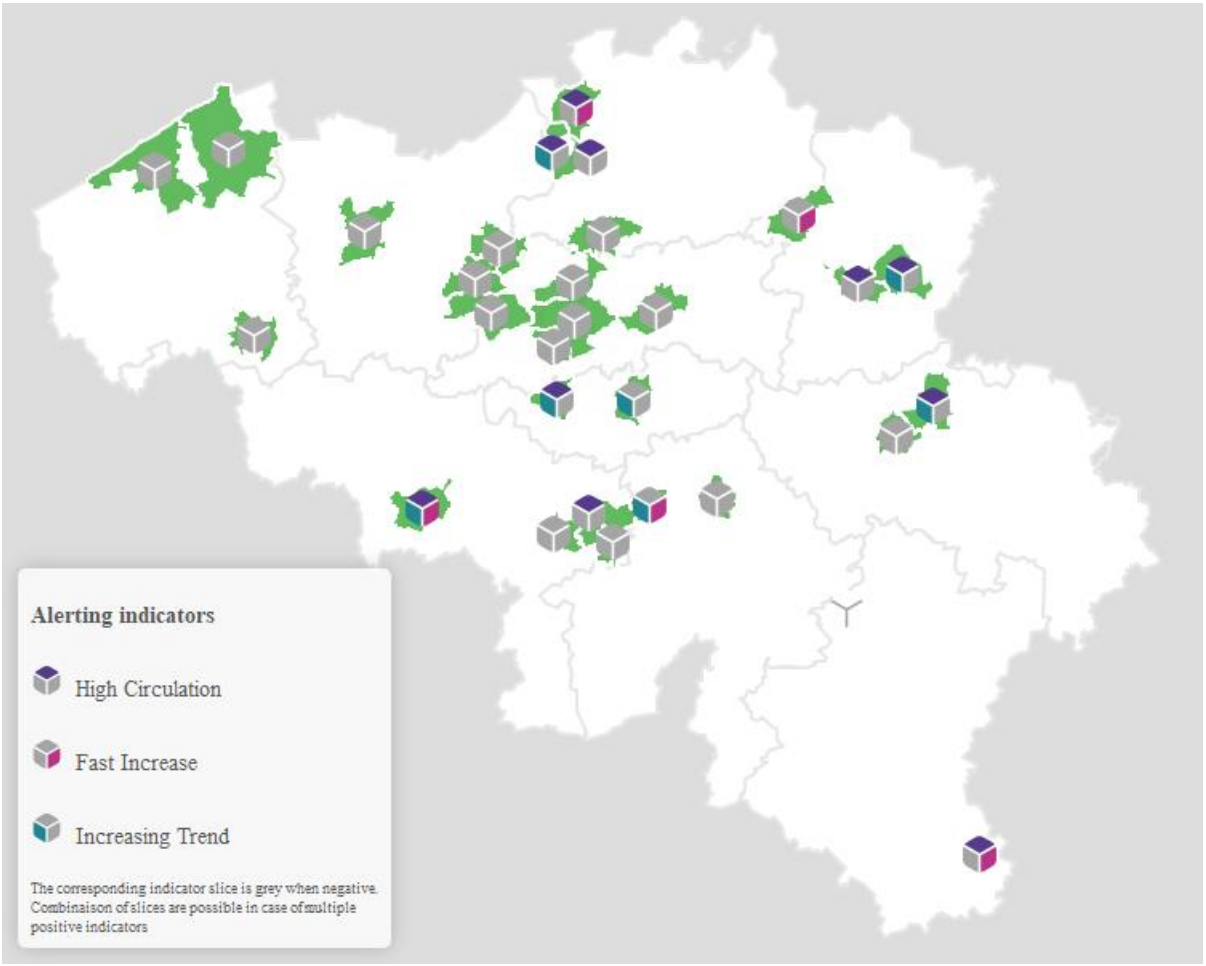


Figure 2 ● The geographical location of the covered areas with the corresponding status of the three alerting indicators: High circulation, Fast Increase and Increasing trend. If an indicator is in alert its corresponding slice is displayed in its colour (see legend) whereas when not in alert the same slice is greyed out. When no data is available for an area, the 3 slices are displayed in white. The names of the covered areas with respect of their localization can be found in Figure 1.

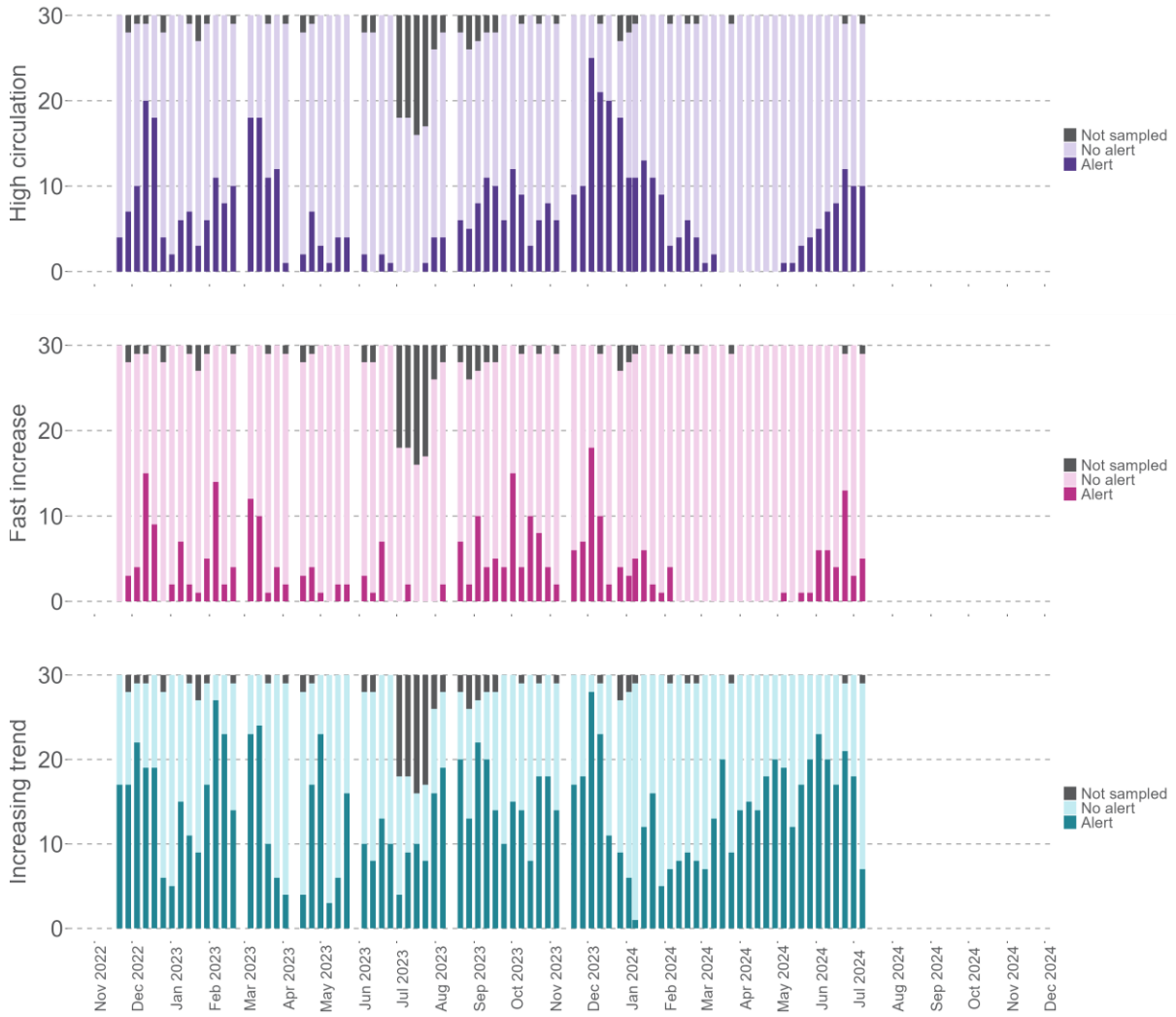


Figure 3 ● Number of areas having an indicator (coloured bars) in alert , number of areas having an indicator not in alert (lighter coloured bars) and number of areas not sampled (greyed out bars). Latest results correspond to week 28 (July 08th 2024).

5.2. Regional level

Figure 4 shows, at the regional level, the viral loads in the wastewaters.

Two waves can be seen in Figure 4:

- The 9th wave starting on 21st November 2022.
- The 10th wave starting on 23rd January 2023.
- The 11th wave starting on 20th November 2023.

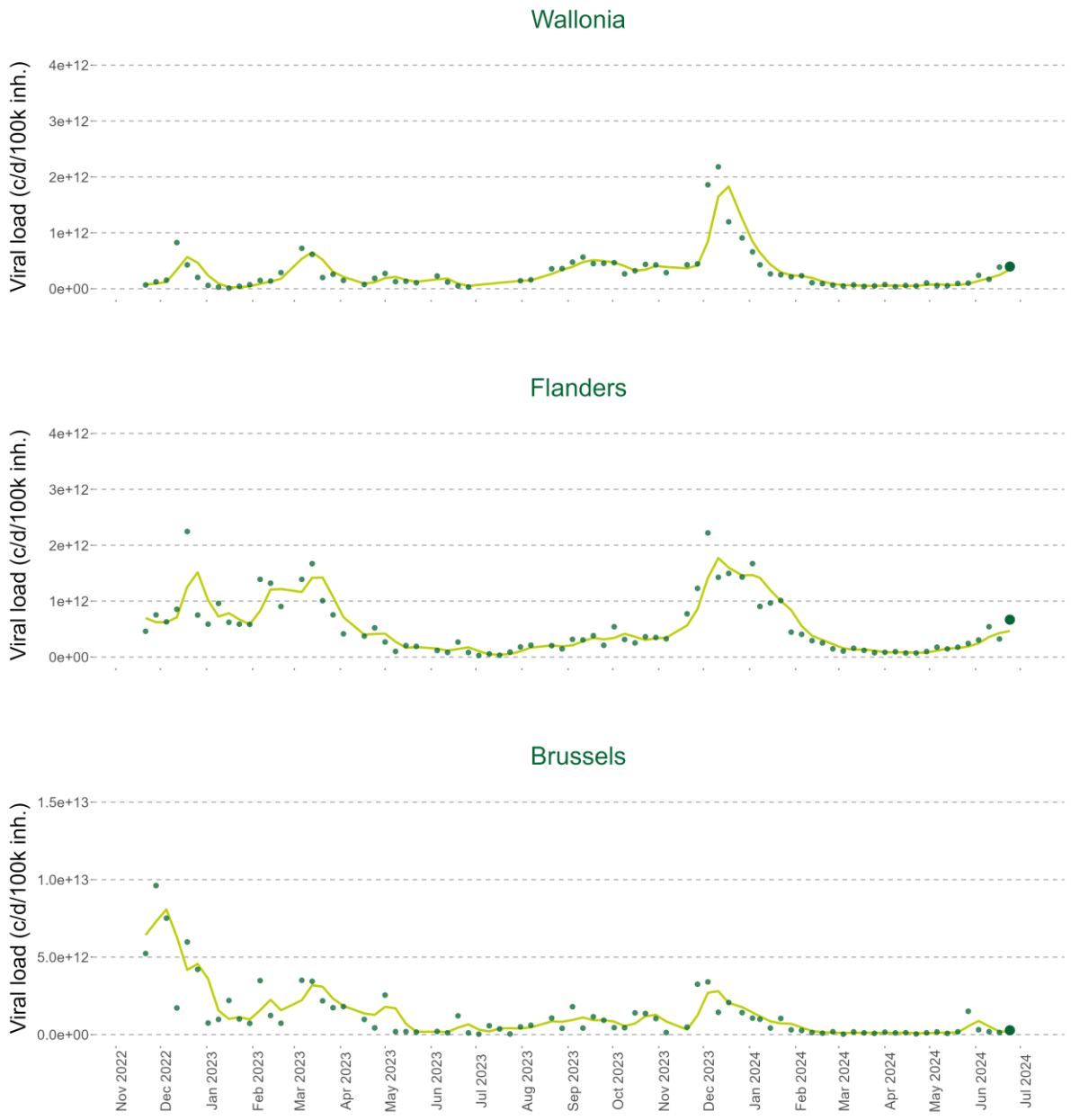


Figure 4 ● The SARS-CoV-2 RNA viral loads expressed as copies/days/100k inhabitants (based on the past two weeks moving average) for the three regions.

Table 2 shows, at the regional level, the results obtained on week 28 (last sample of Monday July 08th 2024). It allows to track the changes between the situation as of this week (week 28) and the situation as of last week (week 27). Hereby, two distinct cases are taken into account:

1. If a region has at least one indicator in alert this week and it was not the case last week, its **name is displayed in bold** in the table.
2. If a region has at least one indicator in alert this week and if it also was the case last week, any change in indicator status (i.e. if the value for any indicator has changed from 0 to 1 or from 1 to 0) is indicated in **coloured bold text**.

The High Circulation indicator is in alert in Flanders and Wallonia. The Increasing Trend indicator is in alert in Wallonia.

Table 2 ● Indicators in alert (1) or not (0) on week 28 (July 08th 2024). Columns represent the population coverage of the regions (Pop. coverage) and the three alerting indicators High Circulation (High), Fast Increase (Fast) and Increasing Trend (Incr.). The specifications of the four last columns are explained in the footnotes 1-4 below the table. Missing data is indicated with a "/".

Region	Pop. coverage	High	Fast	Incr.	Norm. viral load (%)[1]	Mean viral load[2]	Norm. evol. (%/week)[3]	Incr. days[4]
Brussels	100%	0	0	**0**	0.88	0.076	0	0
Flanders	30%	1	0	**0**	78.46	0.524	-2	2
Wallonia	30%	1	**0**	1	60.18	0.497	68	12

[1] : the viral load normalized with the maximum viral load measured in the corresponding catchment area during the ninth wave (i.e. from 21th of November 2022 till the first of January 2023).

[2] : the viral load computed on the mean of the replicate of the three targeted gene fragments as explained in section "3.2 Wastewater results". The mean viral load is expressed in 10^12 copies/day/100k inhabitants.

[3] : the slope (%/week) of the past 7 days moving average of the viral load if the corresponding concentration is above the estimated limit of quantification.

[4] : the cumulative number of days of increase of the past 14 days moving average of the viral load.

5.3. Provincial level

Table 3 shows, at the provincial level, the results obtained on week 28 (last sample of Monday July 08th 2024). It allows to track the changes between the situation as of this week (week 28) and the situation as of last week (week 27). Hereby, two distinct cases are taken into account:

1. If a province has at least one indicator in alert this week and it was not the case last week, its **name is displayed in bold** in the table.
2. If a province has at least one indicator in alert this week and if it also was the case last week, any change in indicator status (i.e. if the value for any indicator has changed from 0 to 1 or from 1 to 0) is indicated in **coloured bold text**.

Table 3 shows, for each Province, the results associated with the samples of week 28 (Monday July 08th 2024), for the three alerting indicators:

- The Increasing Trend indicator is in alert in 4 provinces: Brabant Wallon, Hainaut, Liège and Limburg, and was in 6 provinces last week.
- The Fast Increase indicator is in alert in 2 provinces: Hainaut and Luxembourg, and was in 1 province last week.
- The High Circulation indicator is in alert in 6 provinces: Antwerpen, Brabant Wallon, Hainaut, Liège, Limburg and Luxembourg, and was in 4 provinces last week.
- The province of Hainaut is of particular concern as 3 indicators are in alert in this province.

Table 3 ● Indicators in alert (1) or not (0) on week 28 (July 08th 2024). Columns represent the population coverage of the WWTPs within the Province (Pop. coverage) and the three alerting indicators High Circulation (High), Fast Increase (Fast) and Increasing Trend (Incr.). The specifications of the four last columns are explained in the footnotes 1-4 below the table. Missing data is indicated with a "/".

Province	Pop. coverage	High	Fast	Incr.	Norm. viral load (%)[1]	Mean viral load[2]	Norm. evol. (%/w)[3]	Incr. days[4]
Antwerpen	30%	1	0	0	213.32	1.112	-14	2
Brabant Wallon	33%	1	0	1	64.20	0.360	12	13
Brussels	100%	0	0	**0**	0.88	0.076	0	0
Hainaut	31%	1	1	1	56.08	0.504	173	8
Liège	36%	1	**0**	1	66.31	0.565	-16	18
Limburg	21%	1	0	1	127.83	1.546	19	18
Luxembourg	10%	1	**1**	**0**	144.35	1.516	78	0
Namur	25%	0	0	0	35.69	0.228	0	6
Oost-Vlaanderen	27%	0	0	0	6.86	0.047	0	0
Vlaams-Brabant	37%	0	0	**0**	1.92	0.086	0	0
West-Vlaanderen	35%	0	0	**0**	2.00	0.073	0	0

[1] : the viral load normalized with the maximum viral load measured in the corresponding catchment area during the ninth wave (i.e. from 21th of November 2022 till the first of January 2023).

[2] : the viral load computed on the mean of the replicates of the three targeted gene fragments as explained in section "3.2 Wastewater results". The mean viral load is expressed in 10^12 copies/day/100k inhabitants.

[3] : the slope (%/week) of the past 7 days moving average of the viral load if the corresponding concentration is above the estimated limit of quantification.
[4] : the cumulative number of days of increase of the past 14 days moving average of the viral load.

5.4. Individual catchment areas level

Table 4 shows, at the catchment area level, the results obtained on week 28 (last sample of Monday July 08th 2024). It allows to track the changes between the situation as of this week (week 28) and the situation as of last week (week 27). Hereby, three distinct cases are taken into account:

1. If an area has at least one indicator in alert this week and it was not the case last week, its **name is displayed in bold** in the table.
2. If an area has at least one indicator in alert this week and if it also was the case last week, any change in indicator status (i.e. if the value for any indicator has changed from 0 to 1 or from 1 to 0) is indicated in **coloured bold text**.

Any area which had at least one indicator in alert last week but not this week is listed below Table 4.

Here are the results associated with the samples of week 28 (July 08th 2024):

- The Increasing Trend indicator is in alert in 7 covered areas. Amongst these areas, the viral load is continually increasing since two or more weeks in 5 areas: Genk (49 days), Liege Oupeye (28 days), Mornimont (21 days), Vallee du Hain (L'Orchis) (21 days) and Wasmuel (21 days). Further details can be found in Appendix A3. Last week, this indicator was in alert in 18 covered areas.
- The Fast Increase is in alert in 5 covered areas: Wasmuel (481.5% increase per week), Mornimont (108.4% increase per week), Tessenderlo (104.1% increase per week), Antwerpen-Noord (81.4% increase per week) and Arlon (78% increase per week) (see Appendix A2 for more details). Last week, this indicator was in alert in 3 covered areas.
- The High Circulation indicator is in alert in 10 covered areas. The full list of these areas can be found in Appendix A1. Last week, this indicator was in alert in 10 covered areas.
- An alerting situation is evidenced for the covered area of Wasmuel as all three indicators are in alert.

The wastewater results at the level of the local covered areas can be accessed online for each area on the COVID-19 dashboard.

Table 4 ● Indicators in alert (1) or not (0) on week 28 (July 08th 2024). Columns represent the provinces, different WWTPs within the Provinces and the three alerting indicators High Circulation (High), Fast Increase (Fast) and Increasing Trend (Incr.). The specifications of the four last columns are explained in the footnotes 1-4 below the table. Missing data is indicated with a "/".

Province	WWTP	High	Fast	Incr.	Norm. viral load (%)[1]	Mean viral load[2]	Norm evol. (%/week)[3]	Incr. days[4]
Antwerpen	Antwerpen-Noord	1	**1**	0	121.81	0.67	81.4	0
Antwerpen	**Antwerpen-Zuid**	1	0	1	456.12	2.29	0.0	7
Luxembourg	Arlon	1	**1**	**0**	144.35	1.52	78.0	0
Brabant Wallon	**Basse Wavre (Dyle)**	0	0	1	27.91	0.13	0.0	7
Antwerpen	Deurne	1	**0**	**0**	139.01	0.77	-64.6	0

Province	WWTP	High	Fast	Incr.	Norm. viral load (%)[1]	Mean viral load[2]	Norm evol. (%/week)[3]	Incr. days[4]
Limburg	Genk	1	0	1	166.18	2.52	3.1	49
Limburg	Hasselt	1	0	0	148.41	1.40	-19.5	0
Liège	Liege Oupeye	1	0	1	103.47	0.88	-25.1	28
Hainaut	Montignies-sur-Sambre	1	0	0	57.18	0.42	0.7	0
Namur	Mornimont	0	1	1	38.74	0.60	108.4	21
Limburg	Tessenderlo	0	1	0	37.81	0.29	104.1	0
Brabant Wallon	Vallee du Hain (L'Orchis)	1	0	1	113.35	0.67	29.0	21
Hainaut	Wasmuel	1	1	1	74.46	0.66	481.5	21

[1] : the viral load normalized with the maximum viral load measured in the corresponding catchment area during the ninth wave (i.e. from 21th of November 2022 till the first of January 2023).
[2] : the viral load computed on the mean of the replicates of the three targeted gene fragments as explained in section "3.2 Wastewater results"; The mean viral load is expressed in 10^12 copies/day/100k inhabitants.
[3] : the slope (%/week) of the past 7 days moving average of the viral load if the corresponding concentration is above the estimated limit of quantification.
[4] : the cumulative number of days of increase of the past 14 days moving average of the viral load.

The following areas had the corresponding indicator in alert last week but not this week:

- Increasing Trend indicator: Brussels-North, Dendermonde, Grimbergen, Harelbeke, Leuven, Liedekerke, Liege Sclessin, Mechelen-Noord and Oostende.
- Fast Increase indicator: Grimbergen.
- High Circulation indicator: Dendermonde and Grimbergen.

Further details on covered area without indicators in alert can be found in Table A4.

5.5. Genomic surveillance

The viral loads and variant proportion for the areas of Brussels-North, Gent, Liège Oupeye and Brussels Airport are shown in Figures 5 to 8, respectively. Information on the Pango lineages are presented in Table A6.

Assessment of the situation can be found in the Summary section above.

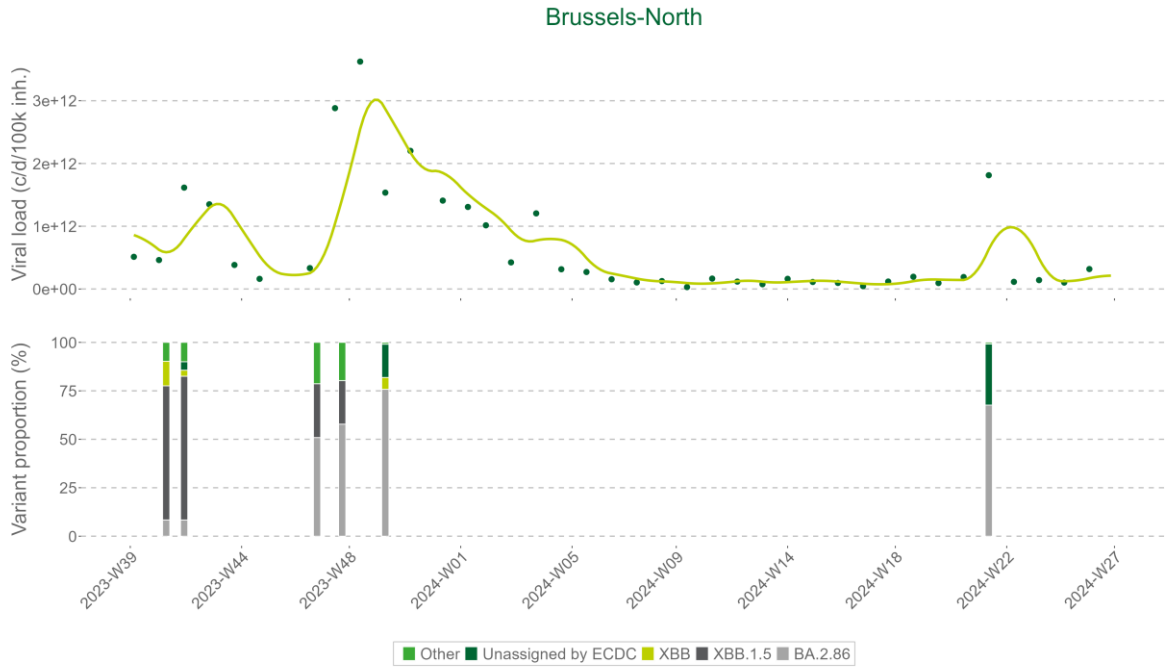


Figure 5 ● SARS-CoV-2 viral loads expressed as copies/days/100k inhabitants (based on the past two weeks moving average) and variant proportion using the ECDC classification for the area of Brussels-North.

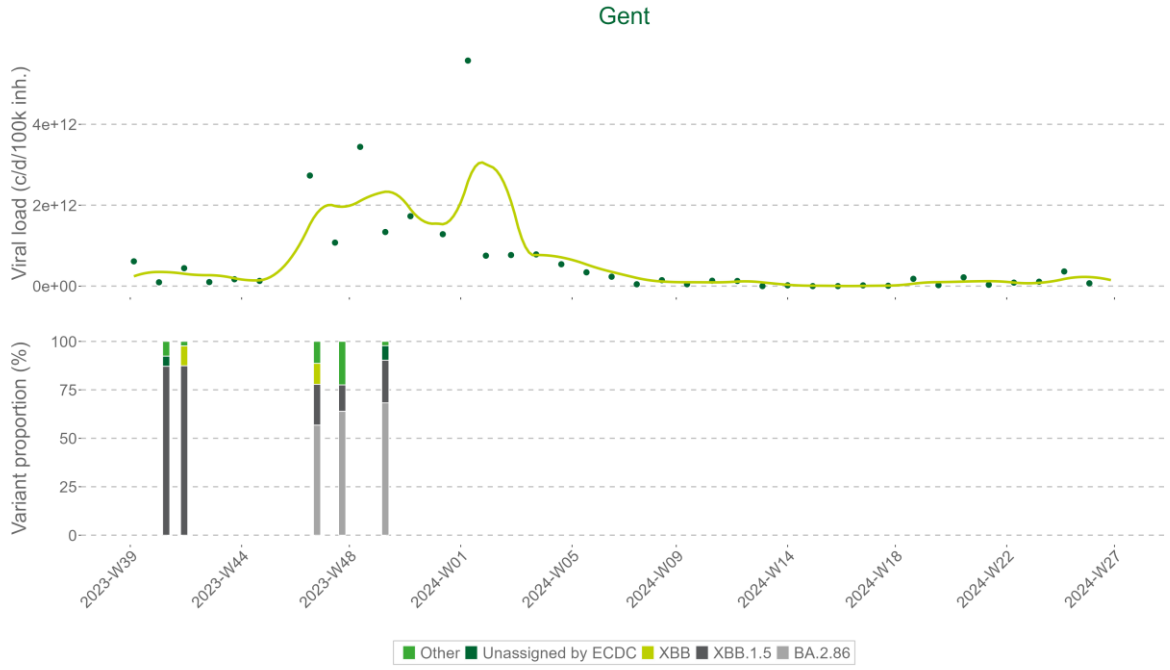


Figure 6 ● SARS-CoV-2 viral loads expressed as copies/days/100k inhabitants (based on the past two weeks moving average) and variant proportion using the ECDC classification for the area of Gent.

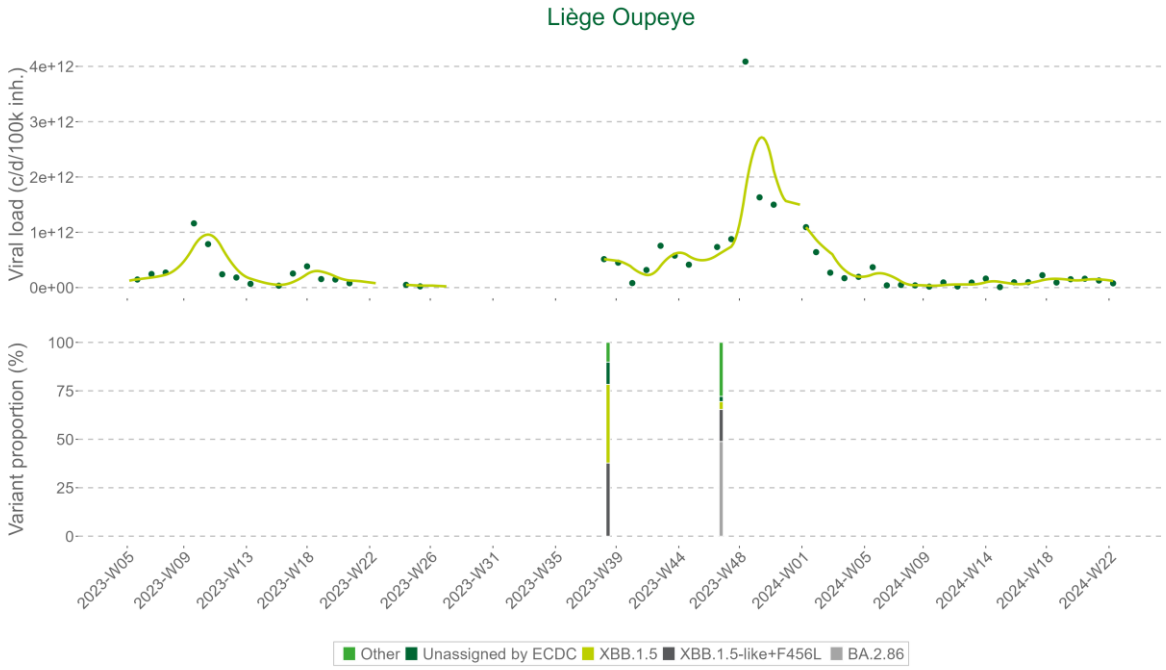


Figure 7 ● SARS-CoV-2 viral loads expressed as copies/days/100k inhabitants (based on the past two weeks moving average) and variant proportion using the ECDC classification for the area of Liège Oupeye.

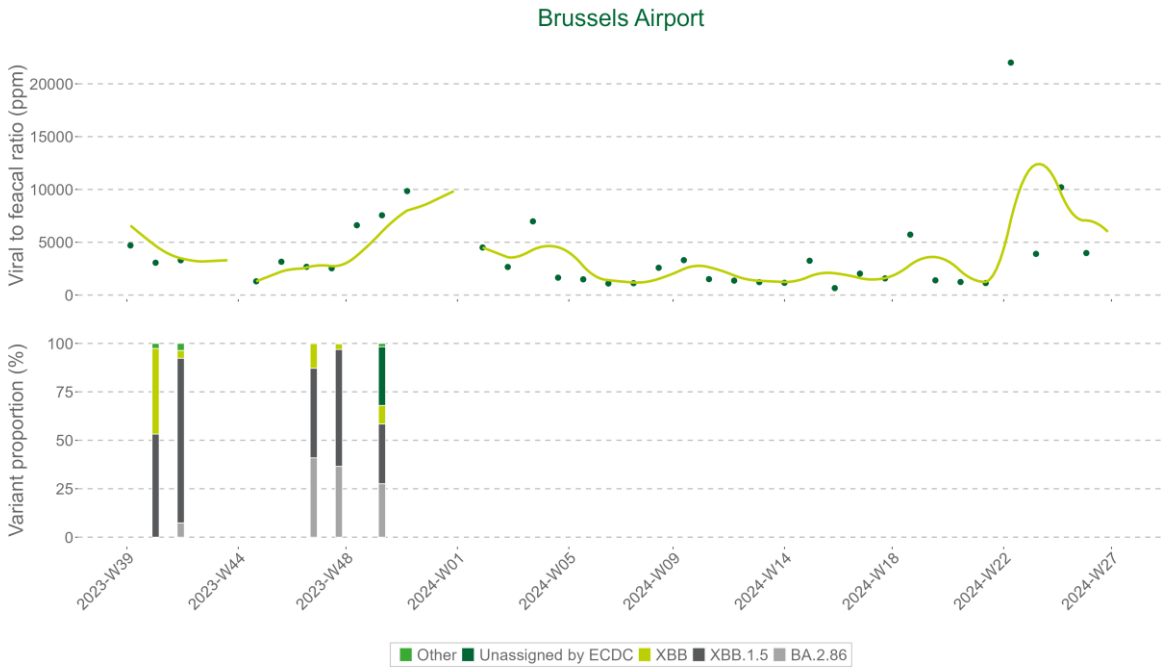


Figure 8 ● Viral ratio expressed as SARS-CoV-2 copies / PMMoV copies (based on the past two weeks moving average) and variant proportion using the ECDC classification for the area of Brussels Airport.

6. APPENDIX – AREAS CLASSIFIED BY INDICATOR

Table A1 ● Areas for which the High Circulation indicator is in alert (10 out of 30 on week 28).

Province	WWTP	High	Fast	Incr.	Norm. viral load (%)[1]	Mean viral load[2]	Norm evol. (%/week)[3]	Incr. days[4]	Date Max cc[5]
Antwerpen	Antwerpen-Zuid	1	0	1	456.12	2.29	0.0	7	27/11/2023
Limburg	Genk	1	0	1	166.18	2.52	3.1	49	18/12/2023
Limburg	Hasselt	1	0	0	148.41	1.40	-19.5	0	24/06/2024
Luxembourg	Arlon	1	1	0	144.35	1.52	78.0	0	11/12/2023
Antwerpen	Deurne	1	0	0	139.01	0.77	-64.6	0	22/01/2024
Antwerpen	Antwerpen-Noord	1	1	0	121.81	0.67	81.4	0	11/12/2023
Brabant Wallon	Vallee du Hain (L'Orchis)	1	0	1	113.35	0.67	29.0	21	11/12/2023
Liège	Liege Oupeye	1	0	1	103.47	0.88	-25.1	28	04/12/2023
Hainaut	Wasmuel	1	1	1	74.46	0.66	481.5	21	11/12/2023
Hainaut	Montignies-sur-Sambre	1	0	0	57.18	0.42	0.7	0	11/12/2023

[1] : the viral load normalized with the maximum viral load measured in the corresponding catchment area during the ninth wave (i.e. from 21th of November 2022 till the first of January 2023).
[2] : the viral load computed on the mean of the replicates of the three targeted gene fragments as explained in section "3.2 Wastewater results". The mean viral load is expressed in 10^12 copies/day/100k inhabitants.
[3] : the slope (%/week) of the past 7 days moving average of the viral load if the corresponding concentration is above the estimated limit of quantification.
[4] : the cumulative number of days of increase of the past 14 days moving average of the viral load.
[5] : date at which the measured viral load was the highest since the beginning of the ninth wave. If the date was between the 21th of November 2022 and the first of January 2023, the date is considered to be during the ninth wave and mentioned as such.

Table A2 ● Areas for which the Fast Increase indicator is in alert (5 out of 30 on week 28).

Province	WWTP	High	Fast	Incr.	Norm. viral load (%)[1]	Mean viral load[2]	Norm evol. (%/week)[3]	Incr. days[4]	Date Max cc[5]
Hainaut	Wasmuel	1	1	1	74.46	0.66	481.5	21	11/12/2023
Namur	Mornimont	0	1	1	38.74	0.60	108.4	21	11/12/2023
Limburg	Tessenderlo	0	1	0	37.81	0.29	104.1	0	11/12/2023
Antwerpen	Antwerpen-Noord	1	1	0	121.81	0.67	81.4	0	11/12/2023
Luxembourg	Arlon	1	1	0	144.35	1.52	78.0	0	11/12/2023

[1] : the viral load normalized with the maximum viral load measured in the corresponding catchment area during the ninth wave (i.e. from 21th of November 2022 till the first of January 2023).
[2] : the viral load computed on the mean of the replicates of the three targeted gene fragments as explained in section "3.2 Wastewater results". The mean viral load is expressed in 10^12 copies/day/100k inhabitants.
[3] : the slope (%/week) of the past 7 days moving average of the viral load if the corresponding concentration is above the estimated limit of quantification.
[4] : the cumulative number of days of increase of the past 14 days moving average of the viral load.

[5] : date at which the measured viral load was the highest since the beginning of the ninth wave. If the date was between the 21th of November 2022 and the first of January 2023, the date is considered to be during the ninth wave and mentioned as such.

Table A3 ● Areas for which the Increasing Trend indicator is in alert (7 out of 30 on week 28).

Province	WWTP	High	Fast	Incr.	Norm. viral load (%)[1]	Mean viral load[2]	Norm evol. (%/week)[3]	Incr. days[4]	Date Max cc[5]
Limburg	Genk	1	0	1	166.18	2.52	3.1	49	18/12/2023
Liège	Liege Oupeye	1	0	1	103.47	0.88	-25.1	28	04/12/2023
Namur	Mornimont	0	1	1	38.74	0.60	108.4	21	11/12/2023
Brabant Wallon	Vallee du Hain (L'Orchis)	1	0	1	113.35	0.67	29.0	21	11/12/2023
Hainaut	Wasmuel	1	1	1	74.46	0.66	481.5	21	11/12/2023
Antwerpen	Antwerpen-Zuid	1	0	1	456.12	2.29	0.0	7	27/11/2023
Brabant Wallon	Basse Wavre (Dyle)	0	0	1	27.91	0.13	0.0	7	25/09/2023

[1] : the viral load normalized with the maximum viral load measured in the corresponding catchment area during the ninth wave (i.e. from 21th of November 2022 till the first of January 2023).
[2] : the viral load computed on the mean of the replicates of the three targeted gene fragments as explained in section “3.2 Wastewater results”. The mean viral load is expressed in 10^12 copies/day/100k inhabitants.
[3] : the slope (%/week) of the past 7 days moving average of the viral load if the corresponding concentration is above the estimated limit of quantification.
[4] : the cumulative number of days of increase of the past 14 days moving average of the viral load.
[5] : date at which the measured viral load was the highest since the beginning of the ninth wave. If the date was between the 21th of November 2022 and the first of January 2023, the date is considered to be during the ninth wave and mentioned as such.

Table A4 ● Areas for which none of the three indicators is in alert (16 out of 30 on week 28).

Province	WWTP	High	Fast	Incr.	Norm. viral load (%)[1]	Mean viral load[2]	Norm evol. (%/week)[3]	Incr. days[4]	Date Max cc[5]
Oost-Vlaanderen	Aalst	0	0	0	2.97	0.06	0	0	17/10/2022
West-Vlaanderen	Brugge	0	0	0	2.95	0.13	0	0	9th wave
Brussels	Brussels-North	0	0	0	0.67	0.07	0	0	9th wave
Brussels	Brussels-South	0	0	0	1.8	0.08	0	0	17/10/2022
Oost-Vlaanderen	Dendermonde	0	0	0	32.31	0.1	0	0	06/02/2023
Oost-Vlaanderen	Gent	0	0	0	0.56	0.03	0	0	03/01/2024
Vlaams-Brabant	Grimbergen	0	0	0	1.25	0.02	0	0	14/11/2022
West-Vlaanderen	Harelbeke	0	0	0	0.99	0.03	0	0	04/12/2023
Vlaams-Brabant	Leuven	0	0	0	0.43	0.02	0	0	04/12/2023
Vlaams-Brabant	Liedekerke	0	0	0	4.41	0.23	0	0	9th wave
Liège	Liege Sclessin	0	0	0	0	0	0	0	04/12/2023
Hainaut	Marchienne-au-Pont	0	0	0	25.51	0.42	0	0	11/12/2023
Antwerpen	Mechelen-Noord	0	0	0	3.5	0.07	0	0	9th wave

Province	WWTP	High	Fast	Incr.	Norm. viral load (%)[1]	Mean viral load[2]	Norm evol. (%/week)[3]	Incr. days[4]	Date Max cc[5]
Namur	Namur-Brumagne	0	0	0	34.42	0.07	0	0	11/12/2023
West-Vlaanderen	Oostende	0	0	0	1.55	0.03	0	0	03/01/2024
Hainaut	Roselies	0	0	0	41.25	0.41	-16.1	0	11/12/2023

[1] : the viral load normalized with the maximum viral load measured in the corresponding catchment area during the ninth wave (i.e. from 21th of November 2022 till the first of January 2023).
[2] : the viral load computed on the mean of the replicates of the three targeted gene fragments as explained in section "3.2 Wastewater results". The mean viral load is expressed in 10^12 copies/day/100k inhabitants.
[3] : the slope (%/week) of the past 7 days moving average of the viral load if the corresponding concentration is above the estimated limit of quantification.
[4] : the cumulative number of days of increase of the past 14 days moving average of the viral load.
[5] : date at which the measured viral load was the highest since the beginning of the ninth wave. If the date was between the 21th of November 2022 and the first of January 2023, the date is considered to be during the ninth wave and mentioned as such.

Table A5 ● Areas for which the data are missing on week 28.

Province	WWTP
Luxembourg	Marche-en-Famenne

Table A6: List of Pango lineages with a proportion above 10 % measured in the area of Brussels-North.

Area	Date	ECDC	Pango	Proportion (%)
Brussels-North	2023-10-11	XBB.1.5	EG.5.1	22.80
Brussels-North	2023-10-11	XBB	XBB.2.4	12.70
Brussels-North	2023-10-11	XBB.1.5	XBB.1.16.17	12.05
Brussels-North	2023-10-16	XBB.1.5	EG.5.1.8	17.34
Brussels-North	2023-11-22	BA.2.86	JN.1	26.80
Brussels-North	2023-11-22	BA.2.86	JN.4	13.68
Brussels-North	2023-11-29	BA.2.86	JN.10	16.32
Brussels-North	2023-11-29	BA.2.86	JN.1	15.92
Brussels-North	2023-11-29	BA.2.86	JN.1.1	14.59
Brussels-North	2023-11-29	BA.2.86	JN.1.1.1	10.98
Brussels-North	2023-12-11	BA.2.86	JN.1.1.7	33.74
Brussels-North	2023-12-11	BA.2.86	JN.2.5	26.24
Brussels-North	2023-12-11	BA.2.86	JN.1.22	12.52
Brussels-North	2024-05-27	BA.2.86	JN.1.16	43.52
Brussels-North	2024-05-27	Unassigned by ECDC	XEB	14.52
Brussels-North	2024-05-27	Unassigned by ECDC	JN.1.16.3	13.42
Brussels-North	2024-05-27	BA.2.86	KP.3.1	12.07

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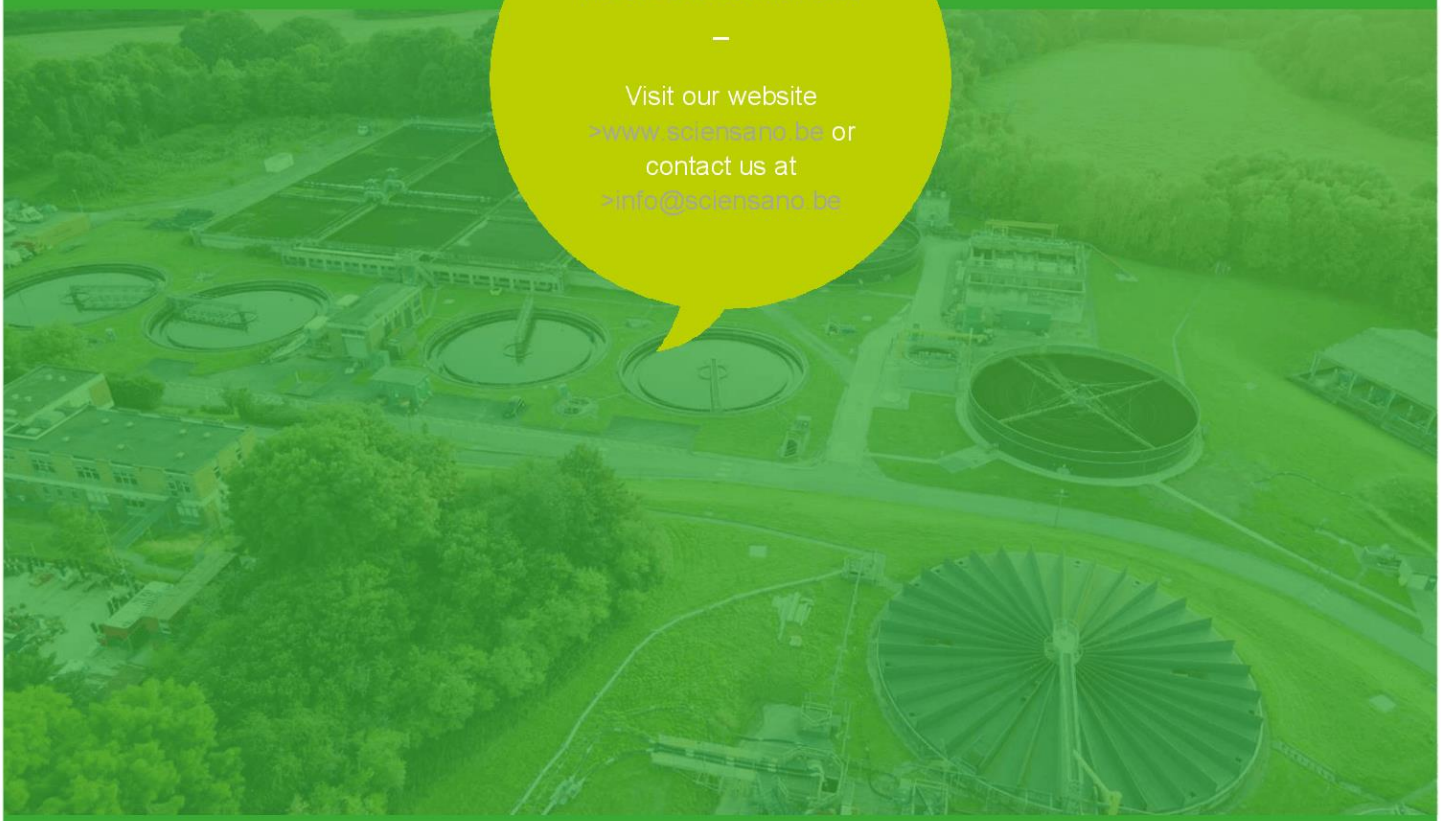

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